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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,865	09/11/2003	Takayoshi Ohtsu	16869G-086700US	8669

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EXAMINER	
WATKO, JULIE ANNE	

ART UNIT	PAPER NUMBER
2653	

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/660,865	OHTSU ET AL.	
	Examiner	Art Unit	
	Julie Anne Watko	2653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09/11/03,11/06/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to because separate figures are not separately labeled. See, for example, Fig. 8. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1 and 3-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al (US Pat. No. 6807034 B2).

Due to similar recitations, independent claims 1 and 3 are treated together.

As recited in claims 1 and 3, Hasegawa et al show a magnetoresistive head (see Fig. 3) comprising: an antiferromagnetic film 21; a pinned magnetic layer 22 which is formed in contact with the antiferromagnetic film, the magnetizing direction of the magnetic layer being pinned by an exchange coupling field with the antiferromagnetic film; a conductive film 23 in contact with the pinned magnetic layer; and a free magnetic layer 34 in contact with the conductive film; wherein the free magnetic layer has first 62 and second 64 free magnetic films sandwiching a non-magnetic intermediate film 63 therebetween, the respective magnetizing directions of the first and the second free magnetic films are in antiparallelism (see arrows in Fig. 3), and a difference between a product of saturation magnetic flux density and a film thickness of the first free magnetic film and that of the second free magnetic film is within a range from 1 to 3 nmT

(see col. 17, lines 44-46, "resultant magnetic moment (saturation magnetization M_s x thickness t) of the free magnetic layer 34 is preferably in the range of 5 T•Å to 60 T•Å" or 0.5 nmT to 6 nmT, which includes the claimed range).

As recited in claim 1, Hasegawa et al show that a conductive film is non-magnetic (see col. 8, lines 56-59, "nonmagnetic interlayer 23").

As recited in claims 1 and 3, Hasegawa et al are silent regarding whether the length of the free magnetic layer in the direction of the track width is 200 nm or less.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrive at the claimed dimensions through the process of routine experimentation and optimization in the absence of criticality *Gardner v. TEC systems, Inc.*, 220 USPQ 777 (Fed. Cir. 1984). The rationale is as follows: one of ordinary skill in the art would have been motivated to reduce the track width in order to increase recording density as is notoriously well known in the art.

Furthermore, Applicant has failed to present any unexpected results due to the claimed dimension.

As recited in claim 4, Hasegawa et al show that a magnetic domain control film 31 is present on a lateral side of the free magnetic layer.

As recited in claims 5 and 6, Hasegawa et al show that the pinned magnetic layer 22 has first 51 and second 53 pinned magnetic films sandwiching a non-magnetic intermediate film 52 therebetween, and the respective magnetizing directions of the first and the second pinned magnetic film are in antiparallelism (see arrows in Fig. 3).

As recited in claims 7, 8 and 9, Hasegawa et al show a magnetic recording unit ("tape recording and for magnetic sensors in addition to for thin-film magnetic heads mounted on hard disk drives", see col. 30, lines 28-32).

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al (US Pat. No. 6807034 B2) in view of Brug et al (US Pat. No. 5930087).

Hasegawa et al show a magnetoresistive head as described above.

As recited in claim 2, Hasegawa et al are silent regarding a non-magnetic insulative film in contact with the pinned magnetic layer and in contact with the free magnetic layer.

As recited in claim 2, Brug et al teach the use of a non-magnetic insulative film ("dielectric barrier 34") in contact with a pinned magnetic layer 32 and in contact with a free magnetic layer 30 and teach that "total power consumption of the recording head 10 is relatively low because a tunnel sensor is a relatively high impedance structure. A low power consumption recording head may be useful for tape heads in which many parallel channels may exist" (see col. 5, lines 29-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the non-magnetic conductive film of Hasegawa et al with the non-magnetic insulative film of Brug et al as taught by Brug et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to replace the non-magnetic conductive film with the non-magnetic insulative film in order to create a high impedance tunnel sensor so as to reduce power consumption as taught by Brug et al (see col. 5, lines 29-33) and as is notoriously well known in the art.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Saito et al (US Pat. No. 6764778 B2) teach that "In recent years, the track width T_W of the thin film magnetic element has been further decreased with a further increase in recording density of a magnetic recording medium, and thus the track width T_W has been required to be decreased to 0.5 μm or less".

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie Anne Watko whose telephone number is ~~(703) 305-7742.~~ 571-272-7597 The examiner can normally be reached on Tues. & Thurs. until 9PM, Wed. & Fri. until 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William R. Korzuch can be reached on ~~(703)305-6137~~. (571)272-7589 The fax phone number for the organization where this application or proceeding is assigned is ~~703-872-9306~~. 703-872-9306

Julie Anne Watko
Primary Examiner
Art Unit 2653

March 10, 2005
JAW